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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/502,441	09/07/2004	Axel Hulsmann	08788.0035USWO	3759

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EXAMINER	
KENNEDY, JENNIFER M	

ART UNIT	PAPER NUMBER
2812	

DATE MAILED: 03/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/502,441	HULSMANN, AXEL	
	Examiner	Art Unit	
	Jennifer M. Kennedy	2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 July 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claim 7 is objected to because of the following informalities: Applicants recite in lines 2-3 of the claim that the "collector structure is formed upon structuring of the base layer and between two successive lithographic steps". The examiner believes this should be replaced with the --collector structure is formed upon structuring of the base layer and with two successive lithographic steps". Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 4-5, and 7-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Eguchi et al. (JP 10-214847).

In re claim 1, Eguchi et al. disclose a method of manufacturing a heterobipolar transistor wherein epitaxially grown layers (2-6) on a substrate are structured by etching, characterized in that an emitter contact and a base contact are formed by simultaneous metallizing (7, 8) of an emitter layer and a base layer (see Figure 4e)

In re claim 4, Eguchi et al. disclose a method characterized in that prior to metallizing the emitter layer and the base layer an emitter structure (5, 6) is etched in

consideration of crystal orientation and material selection so that etching edges of the emitter structure will have an undercut, the etching of the emitter structure being stopped in the zoned of a spacer layer or a base layer (4, see Figure 4b).

In re claim 5, Eguchi et al. disclose the method characterized in that prior to etching the base layer a photoresist layer (91) is applied around the etched emitter structure so as to fully surround the emitter structure with photoresist material and in such a way that at least part of a surrounding portion of the base contact remote from the emitter structure will not be covered by photoresist material.

In re claim 7, Eguchi et al. disclose the method characterized in that collector structure is formed upon structuring of the base layer and between two successive lithographic steps (see Figure 4c and 4g).

In re claim 8, Eguchi et al. disclose the method characterized in that at least part of the collector structure is etched in consideration of material selection so that etching edges of the collector structure will have an undercut, the etching being stopped on a subcollector material (see Figure 4c).

In re claim 9, Eguchi et al. disclose the method characterized in that the epitaxially grown layers are formed at least partly of III-V semiconductor materials (see list of materials provided on page 5; items 2-6).

Claims 1, 2, 4-5, and 7-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Hafizi (U.S. Patent No. 5,729,033).

In re claim 1 disclose a method of manufacturing a heterobipolar transistor wherein epitaxially grown layers on a substrate are structured by etching, characterized in that an emitter contact and a base contact are formed by simultaneous metallizing of an emitter layer and a base layer (see column 7, lines 10-20 and Figure 1k).

In re claim 2 disclose a method characterized in that when metallizing, platinum is vaporized see column 7, lines 10-20 and Figure 1k).

In re claim 4, disclose a method characterized in that prior to metallizing the emitter layer and the base layer an emitter structure is etched in consideration of crystal orientation and material selection so that etching edges of the emitter structure will have an undercut, the etching of the emitter structure being stopped in the zoned of a spacer layer or a base layer (see column 5, lines 1-6).

In re claim 7, disclose the method characterized in that collector structure is formed upon structuring of the base layer and between two successive lithographic steps (see Figure 1e and 1j).

In re claim 8, disclose the method characterized in that at least part of the collector structure is etched in consideration of material selection so that etching edges of the collector structure will have an undercut, the etching being stopped on a subcollector material (see Figure 1j).

In re claim 9, disclose the method characterized in that the epitaxially grown layers are formed at least partly of III-V semiconductor materials (see column 5, lines 34-40).

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hafizi (U.S. Patent No. 5,729,033) in view Amamiya (U.S. Patent No. 6,037,616).

Hafizi discloses the method as claimed and rejected above, including forming the base and emitter layer of platinum, titanium and gold, but does not disclose the method of forming successive metal layers of platinum, titanium, platinum and gold are vapor deposited when metallizing. Amamiya disclose the method of forming successive metal layers of platinum, titanium, platinum and gold are vapor deposited when metallizing (see column 1, lines 35-45). It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the contact of successive metal layers of platinum, titanium, platinum and gold since it reduces the ohmic contact resistance.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hafizi (U.S. Patent No. 5,729,033) in view of Hill (U.S. Patent No. 5,298,438).

Hafizi discloses the method as claimed and rejected above, but does not disclose the method wherein prior to etching the base layer a photoresist layer is applied around the etched emitter structure so as to fully surround the emitter structure with photoresist material and in such a way that at least part of a surrounding portion of the base contact remote from the emitter structure will not be covered by photoresist material.

Hill discloses the method characterized in that prior to etching the base layer a photoresist layer is applied around the etched emitter structure so as to fully surround the emitter structure with photoresist material and in such a way that at least part of a surrounding portion of the base contact remote from the emitter structure will not be

covered by photoresist material (43, see Figure 17, 18). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize photoresist material in order to allow for selective etching to allow for a bipolar transistor with reduced junction capacitance.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hafizi (U.S. Patent No. 5,729,033) in view of Adlerstein (U.S. Patent No. 5,084,750).

Hafizi discloses the method as claimed and rejected above, but does not disclose the method characterized in that a metallic base lead extending between the base contact and base connection port is completely etched under, whereby an air bridge results. Adlerstein disclose the method of forming a metallic base lead extending between the base contact and base connection port is completely etched under, whereby an air bridge results (65, see Figure 17). It would have been obvious to one of ordinary skill in the art at the time the invention was made to form an air bridge in the method of Hafizi in order to allow for heat dissipation.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Kennedy whose telephone number is (571) 272-1672. The examiner can normally be reached on Mon.-Fri. 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael S. Lebentritt can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer M. Kennedy
Patent Examiner
Art Unit 2812

jmk